

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER 1625/00023 <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> 416 Rec'd PCT/PTO 30 SEP 1999 </div>
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <div style="text-align: center; font-weight: bold; font-size: 1.5em;"> 09/402121 </div>
INTERNATIONAL APPLICATION NO. PCT/FI98/00307	INTERNATIONAL FILING DATE 8 April 1998	PRIORITY DATE CLAIMED 16 April 1997
TITLE OF INVENTION Joint Arrangement		
APPLICANT(S) FOR DO/EO/US Jarkko Valtanen		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. § 371. 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). <ul style="list-style-type: none"> <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the Annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 		
Items 11. to 16. below concern other document(s) or information included:		
<ol style="list-style-type: none"> 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. (w/6 references and Form PTO-1449) 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter 16. <input checked="" type="checkbox"/> Other items or information: <ul style="list-style-type: none"> Form PCT/ISA/210 - PCT International Search Report Form PCT/IB/301 - Notification Of Receipt Of Record Copy Form PCT/ISA/220 - Notification Of Transmittal Of The International Search Report Or The Declaration Form PCT/IB/345 - Communication In Cases For Which No Other Form Is Applicable Form PCT/IPEA/409 - International Preliminary Examination Report WO 98/46830 3 sheets of formal drawings Verified Statement (Declaration) Claiming Small Entity Status - Independent Inventor Verified Statement (Declaration) Claiming Small Entity Status - Small Business Concern 		

U.S. APPLICATION NO. If known, see 37 CFR 1.45

09/402121

INTERNATIONAL APPLICATION NO.
PCT/FI98/00307ATTORNEY'S DOCKET NUMBER
1625/00023☒ The following fees are submitted:

CALCULATIONS

PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5)):Search Report has been prepared by the EPO or JPO **\$840.00**

International preliminary examination fee paid to USPTO (37 CFR 1.482)

..... **\$670.00**No international preliminary examination fee paid to USPTO (37 CFR 1.482) but
international search fee paid to USPTO (37 CFR 1.445(a)(2)) **\$760.00**Neither international preliminary examination fee (37 CFR 1.482) nor international
search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$970.00**International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims
satisfied provisions of PCT Article 33(2)-(4) **\$96.00****ENTER APPROPRIATE BASIC FEE AMOUNT =****\$970.00**Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).**\$0.00**

Claims	Number Filed	Number Extra	Rate		
Total Claims	6 - 20 =	0	X \$18.00	\$0.00	
Independent Claims	1 - 3 =	0	X \$78.00	\$0.00	
Multiple dependent claim(s)(if applicable)			+ \$270.00	\$	

TOTAL OF ABOVE CALCULATIONS =**\$970.00**Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity
statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28)**\$485.00****SUBTOTAL =****\$485.00**Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).**\$****TOTAL NATIONAL FEE =****\$485.00**Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00** per property +**\$40.00****TOTAL FEES ENCLOSED =****\$525.00**Amount to be:
refunded \$

charged \$

- a. ☒ A check in the amount of \$525.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 22-0185 in the amount of \$_____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 22-0185. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status**SEND ALL CORRESPONDENCE TO:****Pollock, Vande Sande & Amernick, R.L.L.P.**

1990 M Street, N.W.

Suite 800

Washington, DC 20036-3425

SIGNATURE

for Elzbieta Chłopecka

NAME

32.767

REGISTRATION NUMBER

09/402121

514 Rec'd PCT/PTO 30 SEP 1999

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :
Jarkko VALTANEN :
Serial No. Unknown :
National Phase of PCT/FI98/00307 : Atty Docket: 1625/00023
Filed: September 30, 1999 :
For: JOINT ARRANGEMENT :

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination and fee calculation, please amend the above-identified application as follows:

IN THE CLAIMS:

Claim 3, line 1, delete "or 2".

Claim 4, lines 1-2, change "any of the claims 1-3" to --claim 1--.

Claim 6, line 1, delete "or 5".

REMARKS

Claims 1-6 are pending in this application. By the foregoing amendment, claims 3, 4, and 6 have been amended to eliminate multiple dependencies and thus reduce the filing fee.

These amendments to the claims are believed not to introduce any new matter, and entry of this amendment is respectfully requested.

Favorable consideration of this case is respectfully requested.

Respectfully submitted,

Elzbieta Chlopecka

ELZBIETA CHLOPECKA

Registration No. 32,767

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Date: 09-30-99

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Applicant/Patentee: Jarkko Valtanen
Serial/Patent No.: U.S. Appl. of PCT/FI98/00307 Atty. Dkt No. 1625/00023
Filed on/Issued on: Concurrently Herewith
For: JOINT ARRANGEMENT

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR § 1.9(f) AND § 1.27(b)) - INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR § 1.9(c) for purposes of paying reduced fees under 35 USC §221(a) to the U.S. Patent and Trademark Office with regard to the invention entitled JOINT ARRANGEMENT described in:

- ☒ The specification filed herewith
☐ U.S. Application Serial No. _____, filed _____
☐ U.S. Patent No. _____, issued _____

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR § 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR § 1.9(d) or a non-profit organization under 37 CFR § 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed or licensed, or am under an obligation under contract or law to assign, grant, convey or license, any rights in the invention is listed below:

- ☐ No such person, concern or organization
☒ persons, concerns or organizations listed below*

FULL NAME VARIFORM OY
ADDRESS Matalasalmenuja 1. FIN-00150, Helsinki. FINLAND
☐ Individual ☒ Small Business ☐ Non-Profit


*NOTE: Separate Verified Statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR § 1.27).

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the Issue Fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR § 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC § 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this Verified Statement is directed.

Jarkko Valtanen

NAME OF INVENTOR


Signature
of Inventor

Helsinki, 27th of September 1999

Date

660660" F2T20460

Applicant/Patentee: Jarkko Valtanen
Serial/Patent No.: U.S. Appl. of PCT/FI98/00307 Atty. Dkt. No. 1625/00023
Filed on/Issued on: Concurrently Herewith
For: JOINT ARRANGEMENT

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR § 1.9(d) AND § 1.27(b)) - SMALL BUSINESS CONCERN**

I hereby declare that I am:

- ☐ The owner of the small business concern identified below:
☒ An official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN VARIFORM OY
ADDRESS OF CONCERN Matalasalmenuja 1, FIN-00150, Helsinki, FINLAND

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR § 121.8-18, and reproduced in 37 CFR § 1.9(d), for purposes of paying reduced fees under 35 USC § 41(a) and (b), in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement: (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that the rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled JOINT ARRANGEMENT by inventor(s) Jarkko Valtanen described in:

- ☒ The specification filed herewith
☐ U.S. Application Serial No. _____, filed _____
☐ U.S. Patent No. _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as an independent inventor under 37 CFR § 1.9(c), if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR § 1.9(d) or a non-profit organization under 37 CFR § 1.9(e).

FULL NAME _____

ADDRESS

☐ Individual ☐ Small Business ☐ Non-Profit

*NOTE: Separate Verified Statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR § 1.27).

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the Issue Fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR § 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC § 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this Verified Statement is directed.

NAME OF PERSON SIGNING Jarkko Valtanen
TITLE OF PERSON SIGNING Managing director
ADDRESS OF PERSON SIGNING Auroranka. u l o 3 l y. 00100 Helsinki, Finland

Signature


Jarkko ValtanenDate 27th of September, 1999

09402121.090909

Joint arrangement

5 The invention relates to a joint arrangement for a surface structure, such as a protecting plate, element or a like, which surface structure is meant particularly for covering of ground together with one or several other surface structures for temporary protecting, coating and/or like of the ground. In connection with each surface structure there has been arranged at least a joint arrangement for removable attachment of one or several adjacent surface structures to the same and a thermal insulation, that comprises at least one, essentially plastic based, such as cellular, expanded, foamed plastic structured or a like thermal insulation layer. The joint arrangement comprises a joint piece, that is to be coupled by means of a locking assembly, for coupling of the adjacent surface structures with each other essentially by corners of the same, which joint piece comprises known as such a right-angled, such as a square shaped frame part, whereby the locking assembly is arranged by projections placed at the corners of the frame part and preferably by recesses of the same shape, that are placed underside the surface structure. To the bottom surface of the surface structure there has been arranged preferably an integral support arrangement, that comprises a platform structure projecting from the basic wall thickness of the surface structure, such as the thermal insulation layer.

30 For the purpose above, particularly for covering a field of grass or e.g. of ice, it is previously known to use most heterogeneous arrangements. For example covering elements being sold nowadays by the name TERRAPLAS represent particularly more developed solutions, that are made of plastics by injection moulding. To minimize mass of the covering element in question, it has been produced as a perforated

structure in a way, that not any actual thermal insulation effect may be achieved by the type of covering element. Correspondingly the support arrangements to support the covering elements against the ground must furthermore be attached to the covering elements by means of totally separate auxiliary devices and work stages. In addition to this locking arrangements connecting the covering elements to each other must be attached separately as well, so that a uniform and seamless covering may be achieved by the type of covering elements. The "perforated" structure of the type of covering element above does not either enable exploitation of a so called green house phenomenon particularly in connection with a grass field.

The perforated structure of the covering element in question is naturally advantageous with a view to the breathing of the ground, but the perforation causes in addition to a "rough" appearance and to those thermal insulation problems being described above such disadvantage as well, that garbage may get collected between the covering and the ground, which naturally eliminates good points of the covering element in question in this respect.

On the other hand it is previously known to use e.g. styrox particularly for covering of ice fields, that has been surrounded by both sides of the same by plywood plate. This type of solution is naturally not applicable as such to be installed particularly on a grass field, in case not totally separate foot structures are being used to raise the covering structure apart from the ground. On the other hand when being used in connection with an ice field, such problem of this type of solution has been found, that the plywood plates tend to freeze to the ice, that is why loosening of the same is laborious. In addition to that the type of constructions are very heavy, that is why

storing as well as use of the same for actual coating is disproportionately difficult.

On the other hand Finnish Patent Application No. 964199 discloses a protective structure, the thermal insulation of which comprises advantageously a plastic based, such as cellular, expanded, foamed plastic structured and/or a like thermal insulation layer, to the bottom surface of which there has been arranged an integral support arrangement, that comprises a platform structure projecting from the basic wall thickness of the thermal insulation layer particularly in order to achieve an air space between the protective structure and the ground under the same.

The solution in question is very advantageous in practice, which is due to the fact, that the thermal insulation placed between the ground and the protective structure gets more efficient thanks to the air space between the protective structure and the ground. In this case the feet, that are arranged as an integral platform structure directly to the bottom surface of the thermal insulation layer, prevent first of all so called burning of the grass that is left under the protective structure. In the application in question there has been shown furthermore an advantageous embodiment for coupling of the protective structures with each other by means of joint arrangements, that are arranged to the protective structures in an integral manner during manufacturing of the same and that operate e.g. by quick-locking principle. During tests in practice it has been found justified to improve particularly the joint arrangement coupling the protective structures with each other in such respect, that the protective structures could be on the other hand assembled as easily as possible but however locked in connection with each other reliably and seamlessly.

E.g. application document DE 27 17 625 discloses a covering assembly, that is applicable for temporary covering of ground in principle, wherein three or four covering elements being placed on the ground are being attached by means of a joint piece coupling the covering elements together by the corners of the same and that has holding rings of suitable shape for arrowlike locking pins, that are placed at the corners of the covering elements. The joint pieces being used in this solutions are placed, however, essentially underneath the actual covering elements, that is why they must be sunk into the ground, that is why they are not applicable as such to be used in connection with the type of thin surface structures as being discussed in this connection. On the other hand application document DE 25 58 967 discloses a base structure arrangement, that is to be put together e.g. by stone based elements, in which e.g. four bottom plates are being attached by corners of the same by means of a square shaped joint piece. At corners of the same there are pins, that may be attached to corresponding holes being placed at the corners of the bottom plate. This solution is not either applicable to be used for the type of use of the invention in question, because the bottom plates get supported by the corners of the same on the joint pieces. That is why with the type of solution as such, an entirety operating satisfactorily enough may not be achieved in connection with thin plastic structured covering elements being included to the invention in question. Furthermore application document DE 44 14 341 discloses separate joint arrangements to be used for connecting of concrete plates, that are intended for the corresponding purpose as the above application document. This solution is not as described above either applicable to be used for the type of use of the invention in question, whereby an adequately functioning entirety may not be achieved either, particu-

larly when being used in connection with thin plastic structured covering elements.

It is the aim of the joint arrangement according to this invention to achieve a decisive improvement for this purpose in other words particularly for making the installation of a removable covering structure more efficient and for securing staying together of the same and thus to raise substantially the level of prior art. To achieve this aim the joint arrangement according to the invention is primarily characterized in, that the frame part of the joint piece, that has an open center, such as a framework-like structure is arranged to pass the recesses existing in the platform structure, whereby the height of the recesses is arranged to correspond essentially at least to the thickness of the frame part.

As the most important advantages of the joint arrangement according to the invention may be mentioned easy installation of the surface structures enabled by a joint piece belonging to the same as well as simplicity and technical workability of the construction and manufacturing of the same as well. The invention enables first of all a very smooth covering, which is applicable for most heterogeneous purposes, that is carried out by joint pieces, that remain out of sight under the corners of the surface structures during the installation phase, whereby the surface structures to be coupled with each other may be connected to each other very quickly to form a surface structure, that is adequately smooth and seamless. As an advantageous embodiment the joint piece has a square shaped framework, by means of which e.g. four surface structures may be connected with each other by means of one joint piece operating by quick-locking principle, e.g. by cooperation of locking recesses, that are placed at the corners of the same, and projections, that are

placed at the corners of the joint piece. As an advantageous embodiment the frame part of the joint piece is arranged furthermore to pass the recesses of the platform structure in a way, that the total thickness of the surface structure is not increased therefor. Furthermore, when male couplers, that are placed advantageously at opposite edges of each surface structure, and female couplers, that are placed correspondingly at opposite edges, are being used and that are being placed furthermore at the bottom edges of the outer edges of the surface structures, the covering structure may be coupled in an extremely simple way by continuously "dropping" the following surface structure to be installed from above to its place and by connecting the same to the already installed surface structures by means of joint pieces by corners of the same.

Advantageous embodiment of the joint arrangement according to the invention are represented in the dependent claims related to the same.

In the following description, the invention is illustrated in greater detail with reference to the appended drawings, in which

Fig. 1 shows one advantageous surface structure related to the joint arrangement according to the invention,

Figs 2a - 2c

show furthermore the surface structure being shown in fig. 1 as a detail seen from above (2a), and some advantageous coupling means arrangements as partial side-views for the part of female couplers (2b) and male couplers (2c), and

Figs 3a and 3b

show an advantageous joint piece belonging to the joint arrangement according to the invention as a side-view and seen from above.

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10 The invention relates to a joint arrangement for a surface structure, such as a protecting plate, element or a like, which surface structure is meant particularly for covering of ground together with one or several other surface structures for temporary protecting, coating and/or like of the ground. In connection with each surface structure there has been arranged at least a joint arrangement for removable attachment of one or several adjacent surface structures to the same and thermal insulation 1, that comprises at least one, essentially plastic based, such as cellular, expanded, foamed plastic structured or a like thermal insulation layer 1'. The joint arrangement comprises a joint piece x, that is to be coupled by means of a locking assembly y, for coupling of the adjacent surface structures with each other essentially by corners of the same, which joint piece x comprises known as such a right-angled, such as a square shaped frame part, whereby the locking assembly y is arranged by projections y1 placed at the corners of the frame part and preferably by recesses y2 of the same shape, that are placed underside the surface structure. To the bottom surface of the surface structure there has been arranged preferably an integral support arrangement 1a, that comprises a platform structure projecting from the basic wall thickness s of the surface structure, such as the thermal insulation layer 1'. The frame part x1 of the joint piece x, that has an open center, such as a framework-like structure is arranged to pass the recesses 1a' existing in the platform structure 1a, whereby the height of the recesses is arranged to correspond essentially at least to the thickness h of the frame part x1.

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With reference particularly to figs 1 and 2, at each corner of the surface structure there has been arranged two recesses y2 one after the other at each side. This enables first of all that, that with only one joint piece x e.g. as shown in figs 3a and 3b it is possible to couple four surface structures with each other by the corners of the same or e.g. when a straight gable edge is being formed only two surface structures side by side.

Furthermore with reference to fig. 2a, the platform structure 1a is arranged by single and square shaped platforms 1a", that are placed advantageously all over the bottom surface of the surface structure, whereby the frame part x1 of the joint piece is arranged to embed preferably for platforms 1a".

As an advantageous embodiment, the surface structures are square shaped, the dimensions of which are e.g. 1500 x 1500 mm, in which case the joint arrangement comprises coupling means z, such as male-female couplers z1, z2 being placed at the outer edges of the surface structure, that are carried out in the solution according to the invention advantageously in a way, that both the male and female couplers z1, z2 are arranged at opposite outer edges of the surface structure as shown in fig. 1. Furthermore as an advantageous embodiment with reference particularly to figs 2b and 2c, the male couplers z1 are arranged by projections being placed at the lower edges of the longitudinal p1 outer edges of the surface structure and correspondingly the female couplers z2 by recesses being placed at the lower edges of the crosswise p2 outer edges. In this way particularly coupling of the surface structures with each other is enabled in a way, that the following surface structure to be installed may be attached to the surface structures, that are installed already on the ground, after coup-

ling of the male coupler z1 existing at the outer edge of the same by lowering thereafter the outer surface being equipped with female coupler z2 essentially freely from above to its place and by locking the corners of the same to the above by means of joint pieces x.

Furthermore as an advantageous embodiment with reference to the views shown particularly in figs 2b and 2c, the male and female couplers z1, z2 comprise furthermore an auxiliary support/sealing assembly z3, that is carried out by such as counterpart surfaces or the like being placed at the upper edge of the outer surface of the surface structure at an angle α , that deviates essentially from the vertical direction, preferably at an angle of 15° and being directed to opposite direction and/or to the same direction in respect to the surface structure. With counterpart surfaces being directed to opposite directions it is first of all possible to achieve an auxiliary locking arrangement of a so called snap-joint type, and by means of counterpart surfaces being directed to the same direction as shown in figs 2b and 2c, the joint between the surface structures may get sealed.

It is obvious, that the invention is not limited to the embodiments presented or described above, but it can be modified within the basic idea even to a great extent. In this connection it is naturally possible to equip the surface structure to be used in connection with the joint arrangement more abundantly by exploiting e.g. separate support arrangements according to traditional practice or auxiliary reinforcing plates or the like in the surface structures. It is furthermore naturally possible to put up each single surface structure e.g. of several frame parts, that are connected to each other by suitable fastening arrangements either during manufacturing or that may be put

together during installation in site. In this connection the surface structures may be connected by other types of joint pieces also, deviating from the type of joint piece being shown above, which reach e.g. further to the center parts of the surface structure. It is furthermore naturally possible to use different kinds of coatings, also, for coating of the surface structure either by the upper surface or the bottom surface of the same. Correspondingly the surface structure as such or the thermal insulation layer belonging to the same may be made of EPS-material, such as expanded polystyrene foam or styrox, XPS-material, such as extruded polystyrene foam, EPP-material, such as expanded polypropylene foam or extruded polyethylene foam or e.g. extruded PVC-structural foam sheet. In a corresponding manner it is naturally possible to make the joint piece belonging to the joint arrangement of most heterogeneous materials, such as of wood, metal, plastics, reinforced plastics, ceramics etc.

Claims

1. Joint arrangement for a surface structure, such as a protecting plate, element or the like, which surface structure is meant particularly for covering of ground together with one or several other surface structures for temporary protecting, coating and/or like of the ground, whereby in connection with each surface structure there has been arranged at least a joint arrangement for removable attachment of one or several adjacent surface structures to the same and thermal insulation (1), that comprises at least one, essentially plastic based, such as cellular, expanded, foamed plastic structured or a like thermal insulation layer (1'), whereby the joint arrangement comprises a joint piece (x), that is to be coupled by means of a locking assembly (y), for coupling of the adjacent surface structures with each other essentially by corners of the same, which joint piece (x) comprises known as such a right-angled, such as a square shaped frame part, whereby the locking assembly (y) is arranged by projections (y1) placed at the corners of the frame part and preferably by recesses (y2) of the same shape, that are placed underside the surface structure, and whereby to the bottom surface of the surface structure there has been arranged preferably an integral support arrangement (1a), that comprises a platform structure projecting from the basic wall thickness (s) of the surface structure, such as the thermal insulation layer (1'), **characterized** in, that the frame part (x1) of the joint piece (x), that has an open center, such as a framework-like structure is arranged to pass the recesses (1a') existing in the platform structure (1a), whereby the height of the recesses is arranged to correspond essentially at least to the thickness (h) of the frame part (x1).

2. Joint arrangement according to claim 1, **characterized in**, that the platform structure (1a) is arranged by single and square shaped platforms (1a"), that are placed preferably all over the bottom surface of the surface structure, whereby the framepart (x1) of the joint piece is arranged to embed preferably four platforms (1a").

3. Joint arrangement according to claim 1 or 2, **characterized in**, that at each corner of the surface structure there has been arranged two recesses (y2) one after the other at each side.

4. Joint arrangement according to any of the claims 1-3 in an essentially square shaped surface structure, whereby the joint arrangement comprises coupling means (z), such as male-female couplers (z1, z2) being placed at the outer edges of the surface structures, **characterized in**, that both the male and female couplers (z1, z2) are arranged at opposite outer edges of the surface structure.

5. Joint arrangement according to claim 4, **characterized in**, that the male couplers (z1) are arranged by projections being placed at the lower edges of the longitudinal (p1) outer edges of the surface structure and correspondingly the female couplers (z2) by recesses being placed at the lower edges of the crosswise (p2) outer edges.

6. Joint arrangement according to claim 4 or 5, **characterized in**, that the male and female couplers (z1, z2) comprise an auxiliary support/sealing assembly (z3), that is carried out by such as counterpart surfaces or the like being placed at the upper edge of the outer surface of the surface structure at an angle (α), that deviates essentially from the vertical direction, preferably at an angle of 15°, and being

directed to opposite directions and/or to the same direction in respect to the surface structure.

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(57) Abstract

5 The invention relates to a joint arrangement
for a surface structure, such as a protecting
plate, element or the like, which surface
structure is meant particularly for covering
of ground together with one or several other
surface structures for temporary protecting,
coating and/or like of the ground. In connec-
10 tion with the surface structure there has
been arranged at least a joint arrangement
for removable attachment of one or several
adjacent surface structures to the same and
the thermal insulation (1), that comprises at
15 least one, essentially plastic based, such as
cellular, expanded, foamed plastic structured
or a like thermal insulation layer (1'). The
joint arrangement comprises a joint piece
(x), by means of which the surface structures
20 may be coupled with each other essentially by
corners of the same by means of a locking
assembly (y) operating advantageously by
quick-locking principle.

25 Fig. 3

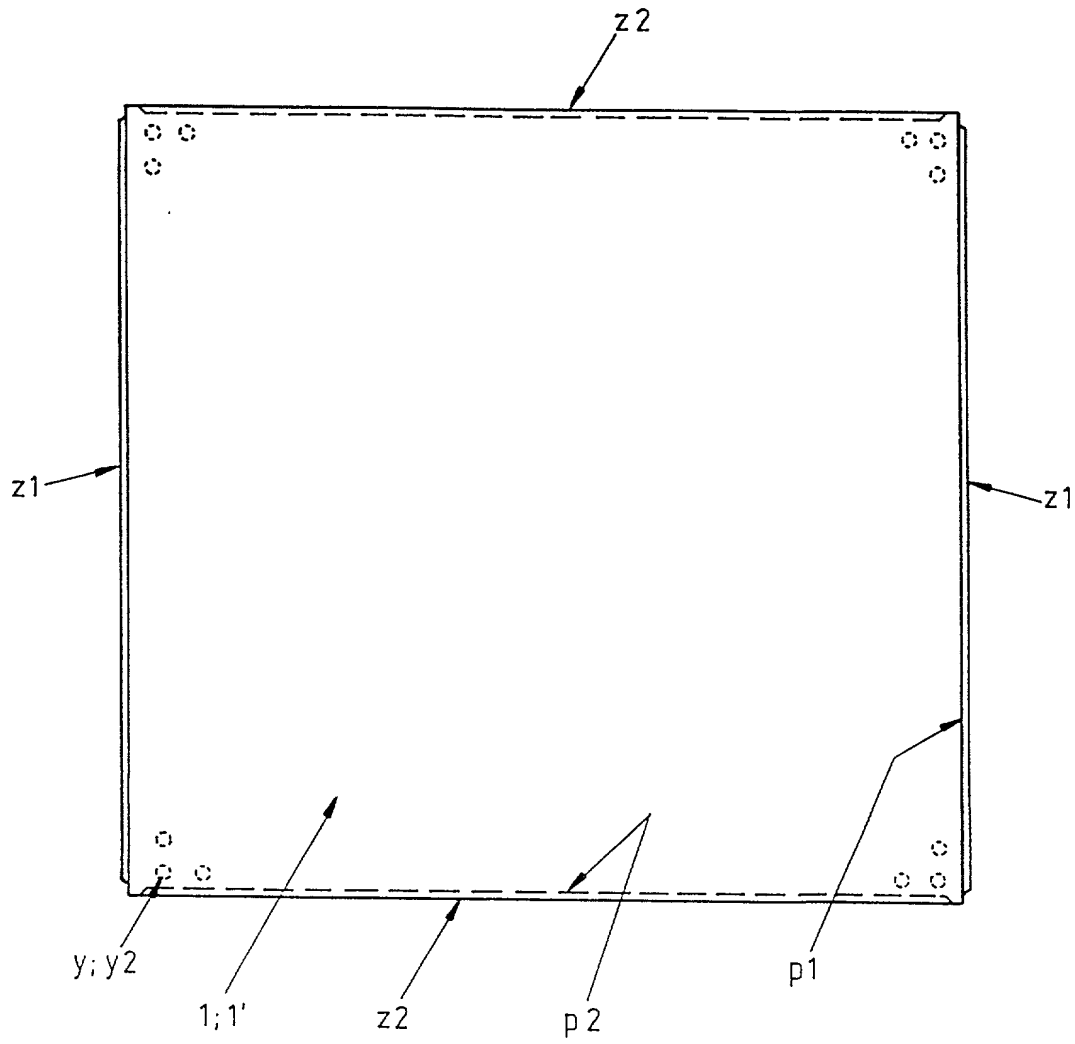
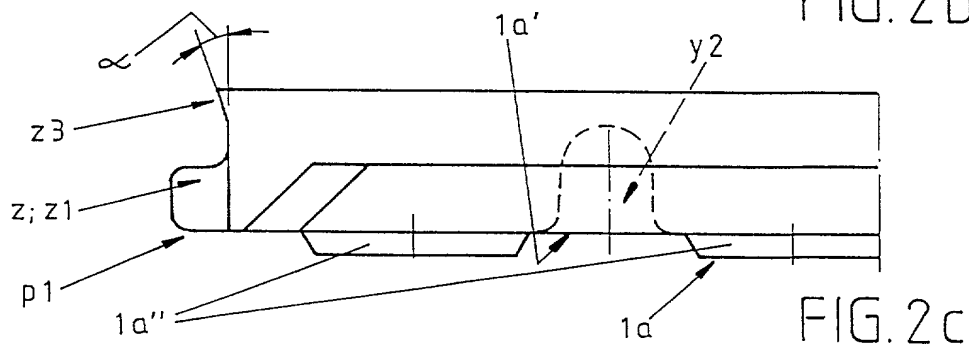
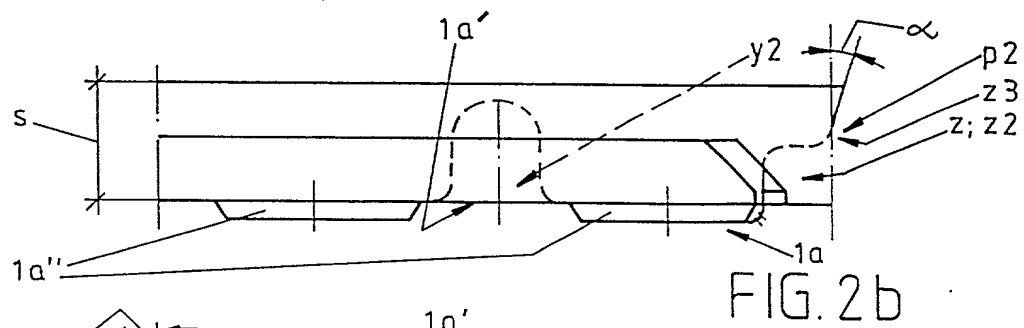
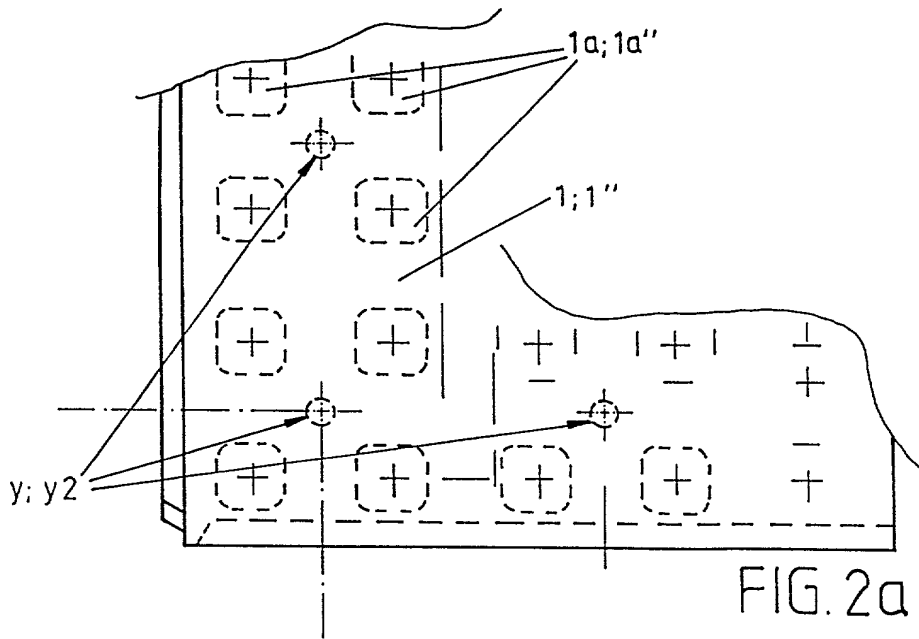


FIG. 1



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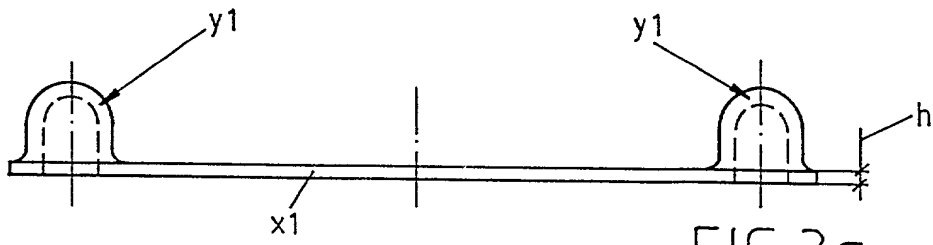


FIG. 3a

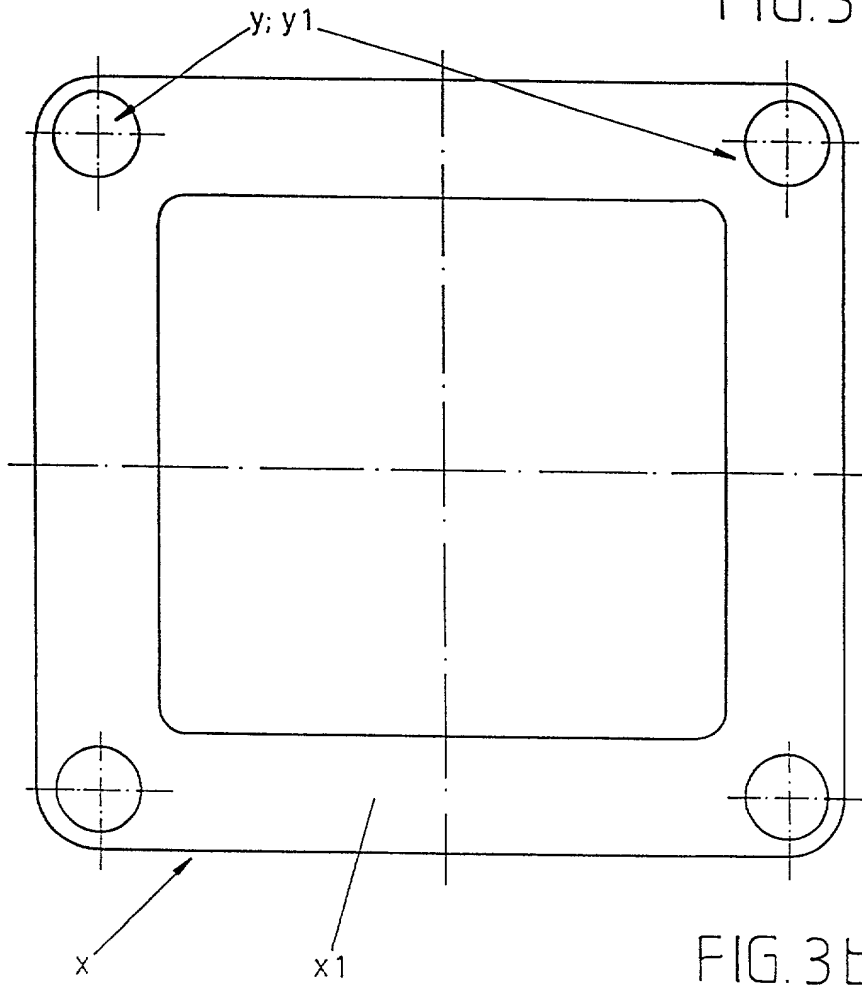


FIG. 3b

DECLARATION FOR PATENT APPLICATION

1625/00023

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

JOINT ARRANGEMENT

the specification of which: (check one)

1) is attached hereto. ☒ was filed on 8 April 1998 as PCT International Application Number PCT/FI98/00307 and was amended on 19 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 CFR § 1.56(a)

Prior Foreign Application(s): I hereby claim foreign priority benefits under 35 U.S.C. § 119(e)-(d) or § 165(b) of any foreign application(s) for patent or inventor's certificate listed below, or § 353(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Priority Claimed

Application No.	Country	Filing Date	Yes	No
<u>971594</u>	<u>Finland</u>	<u>16 April 1997</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Application No.)	(Country)	(Day/Month/Year Filed)		
(Application No.)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>	<input type="checkbox"/>
(Application No.)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>	<input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application No.

Filing Date

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by 35 U.S.C. § 112, first paragraph, I acknowledge the duty to disclose material information as defined in 37 CFR § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application

(U.S. Application Serial No.)

(U.S. Filing Date)

(Status—patented, pending, abandoned)

(U.S. Application Serial No.)

(U.S. Filing Date)

(Status—patented, pending, abandoned)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the use of such are punishable by fine or imprisonment or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of any patent issued thereon

Full name of sole or first inventor: Jarkko ValtanenInventor's Signature: [Signature]Date 27.09.1999Residence Address Aurorankatu 15 B 19, FIN-00100, Helsinki, FINLANDCitizenship FinnishPost Office Address Same as Residence Address

[7 See next page for additional inventors